इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 1448-102 (1981): Methods of test for petroleum and its products, Part 102: Determination of air release value [PCD 1: Methods of Measurement and Test for Petroleum, Petroleum Products and Lubricants]

“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartṛhari—Nītiśatakam
“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE

BRUTUM FULMEN
IGNORANTIA JURIS NON EXCUSAT
PROTECTED BY COPYRIGHT

IS : 1448 [P : 102] - 1981
Adopted : 11 February 1981

(Reaffirmed 2003)

Indian Standard

METHODS OF TEST FOR PETROLEUM AND ITS PRODUCTS

[P : 102]

DETERMINATION OF AIR RELEASE VALUE

UDC 621·892·098 : 541·12·012·6

Adapted from the Institute of Petroleum (U.K.) Standard No. IP 313/77

1. SCOPE

1.1 This method gives a measure of the ability of an oil to separate entrained air. It is commonly applied to hydraulic and turbine oils, but may also be used for other lubricating oils. It may be used for petroleum-base lubricants or for synthetic fluids such as phosphate esters. This method may also be used to determine the rate of release of other gases from oil when the gas pressure needs to be adjusted to maintain the same gas flow rate. The precision statement does not necessarily apply to other gases.

2. DEFINITION

2.1 Air Release Value — The number of minutes for air entrained in the oil to reduce in volume to 0·2 percent under the conditions of this test and at the specified temperature.

3. SUMMARY OF METHOD

3.1 Compressed air is blown through the test oil heated to a temperature of 25, 50 or 75°C. After the air flow is stopped, the time required for the air entrained in the oil to reduce in volume to 0·2 percent is recorded.

© *Copyright* 1981

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

[redacted] Gr 2

September 1981

4. APPARATUS

4.0 Of the form shown in Fig. 1 and consisting of the following:

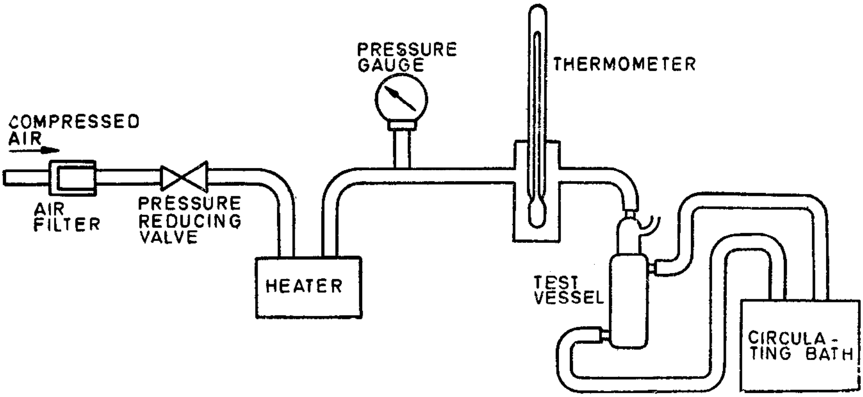


FIG. 1 ASSEMBLY OF APPARATUS

4.1 Test Vessel — of glass, shown in Fig. 2, consisting of a jacketed sample tube fitted with an air-inlet capillary, baffle plate and an air-outlet tube. The two parts of each test vessel should be marked and used as a pair. Interchanged parts may be used so long as the resultant test vessel conforms to the stated dimensions.

4.2 Pressure Gauge — Range 0 to 355 mbar (0 to 35·5 kPa).

4.3 Thermometer* — Range 0 to 100°C in 0·2°C intervals.

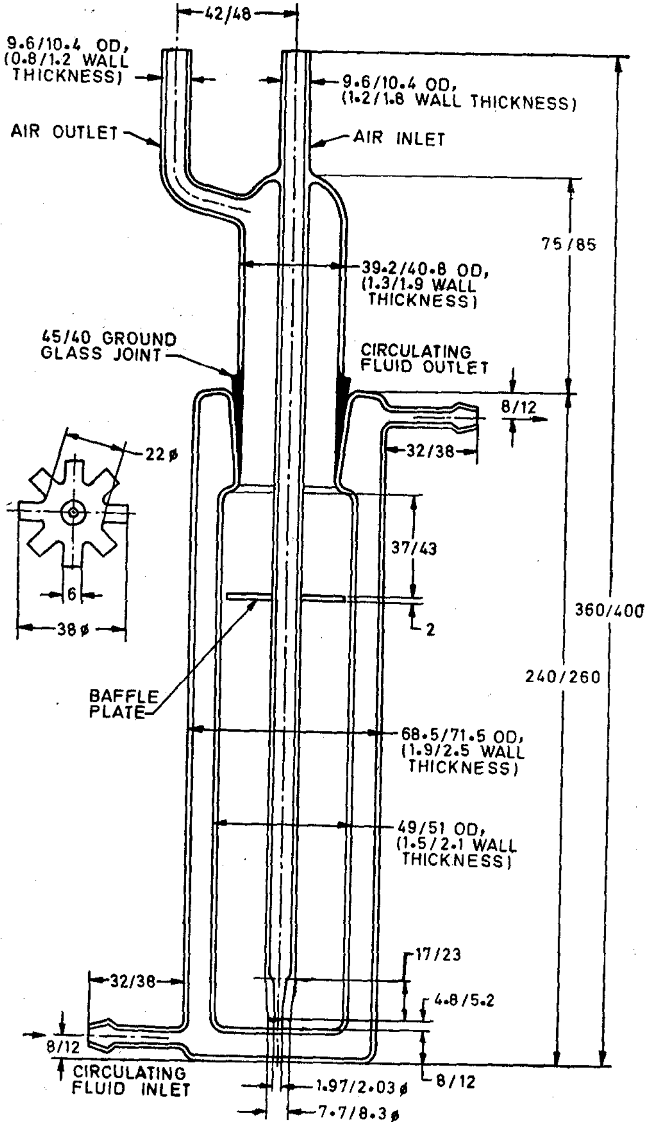
4.4 Heater — To bring the compressed air up to measurement temperature. A coil of copper tubing immersed in the circulating bath (*see* **4.6**) is suitable at 25°C, but additional heating is necessary at 50°C and 75°C and this can be obtained by an additional bath or by using a separate steam or electric heat exchanger. Measure the temperature of the air by a thermometer or other suitable means.

4.5 Compressed Air — Filtered to remove any oil. Air from a cylinder may be used.

4.6 Circulating Bath — Approximately 10 litres capacity with a rate of flow of 10 l/min and capable of maintaining the test cell at a temperature of 25, 50 or 75°C within ±0·1°C.

---

*Thermometer conforming to requirements of IP 64C is suitable for this test.



All dimensions in millimetres.

FIG. 2 TEST VESSEL

4.7 Density Balance — Accurate to 0·0005 g/ml, with round-bottomed or tapered sinker with 5 or 10 ml displacement, 80·0±1·5 mm length. If the sinker contains a temperature, it shall be usable between 25° and 75°C.

4.8 Oven — Capable of controlling temperatures up to 100°C.

5. REAGENTS

5.1 Chrome Sulphuric Acid — Dissolve 50 g of potassium dichromate in one litre of concentrated sulphuric acid (98 percent). Store in a glass bottle with a ground-glass stopper.

CAUTION — This solution is strongly acidic and is a powerful oxidizing agent. Protective clothing including eye/face shield, should be worn when it is handled. Splashes on the skin should be immediately and thoroughly washed with water.

5.2 1.1.1.-trichloroethane

CAUTION — 1.1.1.-trichloroethane when heated to decomposition produces highly toxic fumes.

5.3 Acetone — *see* IS : 170-1976*.

6. PREPARATION OF APPARATUS

6.1 Clean the interior of the test vessel including the air inlet and sinker, and all other glassware coming into contact with the sample, before each determination in the following manner. Rinse away the oil residue with 1.1.1.-trichloroethane and dry by air blowing. Clean the apparatus by imersing in chrome sulphuric acid for a minimum period of 12 h in order to completely remove any traces of silicone. Rinse with distilled water until the washings are free from acid, then rinse with acetone and dry with clean compressed air.

7. PROCEDURE

7.1 Assemble the test apparatus as shown in Fig. 1. Set the circulating bath to the test temperature.

7.2 Warm 200 ml of the oil to be tested in an oven set at a temperature of 10°C higher than the test temperature.

7.3 Pour 180 ml of the warmed sample into the test vessel.

7.4 Allow the sample to reach the test temperature. This usually takes about 20 minutes.

7.5 Warm the sinker of the density balance to the test temperature in an air bath, such as a glass cylinder fitted with a suitable cover situated in the circulating bath. When the sinker has reached the test temperature,

---

*Specification for acetone (*second revision*).

immerse it in the sample taking care that no air bubbles cling to it. Attach the sinker to the beam of the density balance by means of the platinum wire so that the bottom of the sinker is 10±2 mm from the bottom of the test vessel.

7.6 Read the density from the balance to the nearest 0·001 g/ml and record it as the initial density, d_o.

7.7 Return the sinker to the air bath and replace it with the air-inlet tube as shown in Fig. 2. After 5 minutes, start the supply of air at a gauge pressure of 200 mbar (20 kPa) at the test temperature. Maintain the pressure and temperatures by readjustments, if necessary.

7.8 After 420±1 second (7 minutes) shut off the air and quickly remove the inlet tube from the test vessel. Immediately start the timer and set up the balance in its original position in relation to the cell and attach the wire to the beam (*see* Note).

NOTE — In the case of certain oils which form a considerable volume of oil/air dispersion, the top of the sinker may initially be in foam and hence density readings at the time may be in error.

7.9 Change the balance setting to correspond to 0·2 percent of air by volume (d—0·001 7), and record the time from shutting off the gas until the balance passes the null point. When using a direct reading density balance, record the time for the balance to reach d_o—0·001 7. If the null point is not reached within 30 minutes, discontinue the test (*see* Note).

NOTE — The value of 0·0017 g/ml refers to an oil of density 0·850. For other densities this value changes by 0·000 1 for each 0·05 change in density, that is, it will be 0·001 6 at 0·800 and 0·002 0 at 1·000.

7.10 Alternatively where the air release-time curve is required proceed as follows. After 1 minute from the time the air is shut off, read and record the density to the nearest 0·001 g/ml as d_t, and thereafter at 60 seconds intervals until the value d_o —0·001 g/ml is reached. If the time separation exceeds 15 minutes, continue to read the density but at intervals of 5 minutes up to a total maximum of 30 minutes.

7.11 Plot a curve of density against time. The time at which the sample reaches 0·2 percent volume of entrained air can then be read directly from the graph and is given by d_o—0·001 7 g/ml.

8. REPORT

8.1 Report the air release value, at (temperature) °C. Times up to 15 minutes shall be recorded to the nearest 0·1 minute, and those from 15 to 30 minutes to the nearest minute.

9. PRECISION

9.1 The following precision data, reproduced from the German standard DIN 51 381 may be used for judging the acceptability of results (95 percent confidence).

9.1.1 *Repeatability* — Duplicate results by the same operator should be considered suspect if they differ by more than the amounts shown in the table under **9.1.2**.

9.1.2 *Reproducibility* — The results submitted by each of two laboratories should not be considered suspect unless they differ by more than the amounts shown in the following table:

Air Release Value (ARV) Minutes	*Repeatability Minutes*	*Reproducibility Minutes*
Up to 5	1	2
Above 5 to 10	2	3
Above 10 to 15	3	4

Printed at Britannia Calendar Mfg Co, Calcutta, India